

AMENDMENT UNDER 37 C.F.R. § 1.111

Application No.: 10/617,868

Atty Docket No.: Q71312

REMARKS

The Office Action of April 19, 2005 has been received and its contents carefully considered.

Claims 1 to 3, 5 to 8 and 10 to 25 are all the claims pending in the application, prior to the present amendment.

The Examiner has indicated that claims 1-3, 5-8 and 10-14 have been allowed, but that claims 15-25 have been rejected.

Claims 15-21, 24 and 25 have been rejected under 35 U.S.C. § 103(a) as obvious over U.S. Patent 6,403,203 to Futamoto et al.

The present invention, as set forth in claim 15 as amended above, is directed to a magnetic recording medium comprising: a non-magnetic substrate; at least a soft magnetic layer formed on the non-magnetic substrate directly or indirectly; an orientation control film that is formed on the soft magnetic layer and controls the orientation of a film provided directly thereabove; an intermediate film formed on the orientation control film; a perpendicular magnetic recording film that is formed on the intermediate film and of which an axis of easy magnetization is generally oriented perpendicularly to the non-magnetic substrate; and a protective film formed on the perpendicular magnetic recording film, wherein the intermediate film is made of a Co alloy and has a saturation magnetization (Ms) of at least 20 (emu/cc) and equal to or less than 200 (emu/cc), and the orientation control film comprises at least one alloy selected from the group consisting of Co alloy, Ni alloy, and Fe alloy, and has an amorphous structure.

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Thus, applicants have amended claim 15 to recite that the orientation control film comprises at least one alloy selected from the group consisting of Co alloy, Ni alloy, and Fe alloy. Support for this amendment can be found in claim 21 which has been canceled.

Applicants have amended independent method claim 24 in a similar manner.

As can be seen from claim 15, a magnetic recording medium according to claim 15 has the following features:

(1) the orientation control film includes at least one alloy selected from the group consisting of Co alloy, Ni alloy, and Fe alloy; and

(2) the orientation control film has an amorphous structure.

As a result of the combination of (1) and (2), an initial growth portion of an intermediate film can be more precisely controlled to 1 nm or less by the orientation control film. See page 10, line 20 to page 11, line 8, and Examples of the present specification.

In contrast, in Futamoto et al, as a first underlayer (corresponding to the orientation control film of the present invention), a CrTi film was deposited.

In Futamoto et al, there is no description or suggestion of the above combination of features and its effect of the present invention. Accordingly, applicants submit that claim 15 is not obvious over Futamoto et al.

Further, since claims 16 to 20 and 25 are dependent on claim 15 directly or indirectly, applicants submit that claims 16 to 20 and 25 are also not obvious over Futamoto et al.

In addition, with respect to claim 20, the Examiner states that the range “equal or less than 1 nm” covers an embodiment where the initial growth portion of the intermediate film has a

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thickness of zero, and, therefore, is not present. The Examiner argues that Futamoto et al disclose at least this embodiment where the initial growth portion of the intermediate film is not present. Applicants assume the Examiner intended to indicate that an amorphous initial growth portion is not present in the intermediate film.

Applicants have amended claim 20 as set forth above to more clearly indicate that the intermediate film has an amorphous initial growth portion. The amendments to claim 20 are based on page 23, lines 23 to 25.

Thus, the magnetic recording medium according to claim 20 has a feature in which the intermediate film has an amorphous initial growth portion and a thickness of the amorphous initial growth portion of the intermediate film is equal to or less than 1 nm. The intermediate film has an amorphous initial growth portion, and an embodiment in which there is no amorphous initial growth portion is not included. Therefore, applicants submit that the above feature of claim 20 is not disclosed or suggested by Futamoto et al.

Turning now to claim 24, it recites a method for manufacturing a magnetic recording medium which has as a feature, a step of forming an orientation control film that includes at least one alloy selected from the group consisting of Co alloy, Ni alloy, and Fe alloy and has an amorphous structure. As described above, since Futamoto et al do not describe or suggest this feature and the effect of the orientation control film, applicants submit that claim 24 is not obvious over Futamoto et al.

In view of the above, applicants submit that claims 15-21, 24 and 25 are not obvious from the teachings of Futamoto et al and, accordingly, request withdrawal of this rejection.

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Claims 22 and 23 have been rejected under 35 U.S.C. § 103(a) as obvious over Futamoto et al in view of the newly cited U.S. Patent 5,815,342 to Akiyama et al.

In essence, the Examiner argues that Futamoto et al disclose all of the recitations of claims 22 and 23, except for the use of a longitudinal magnetic layer beneath the soft magnetic layer. The Examiner relies on Akiyama et al for its teaching of a longitudinal hard magnetic biasing layer beneath a soft magnetic layer in order to suppress Barkhausen noise arising from shifting domain walls in the soft magnetic layer. The Examiner particularly refers to column 10, lines 4 to 31, and the Brief Summary section of Akiyama et al. The Examiner argues that it would have been obvious to add a longitudinal biasing layer as taught by Akiyama et al to the structure taught by Futamoto et al in order to suppress Barkhausen noise.

Claims 22 and 23 depend from claim 15. Accordingly, applicants submit they are patentable for the same reasons as discussed above in connection with the rejection of claim 15.

Further, in Akiyama et al, there is disclosed a perpendicular magnetic recording medium including a bias-field applying layer (corresponding to the permanent magnet film of the present invention), a soft magnetic back layer (corresponding to the soft magnetic layer of the present invention), and a magnetic recording layer (corresponding to the perpendicular magnetic recording film of the present invention). Also, a perpendicular magnetic recording medium including a soft magnetic back layer, non-magnetic layer, and a magnetic recording layer is disclosed. In Akiyama et al, there is no description or suggestion of any layer corresponding to the orientation control film of the present invention. Therefore, claims 22 and 23 are not obvious over Futamoto et al in view of Akiyama et al.

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In view of the above, applicants submit that claims 22 and 23 are not obvious over Futamoto et al and Akiyama et al and, accordingly, request withdrawal of this rejection.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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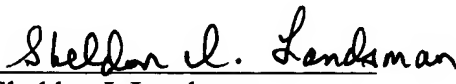
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